IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A method comprising:

detecting a channel error by locating a damaged macroblock ($P_{x,y}$) in multiple macroblocks of a video frame using header information by a video decoder; and

isolating the detected channel error to a few macroblocks around the located damaged macroblock to reduce data loss and improve video quality, wherein isolating the detected channel error comprises:

estimating the damaged macroblock by using undamaged macroblocks substantially surrounding a boundary of the damaged macroblock in the video frame by the video decoder, wherein the undamaged macroblocks include 1 to 4 undamaged macroblocks ($P_{x,y-1}$, $P_{x+1,y}$, $P_{x,y+1}$, and $P_{x-1,y}$), and wherein estimating the damaged macroblock includes estimating the damaged macroblock by using a weighted linear interpolation of the undamaged macroblocks surrounding the damaged macroblock; and

replacing the damaged macroblock with the estimated damaged macroblock to conceal the error in the damaged macroblock by the video decoder.

2. (Canceled)

3. (Previously Presented) The method of claim 1, further comprising:

receiving a coded video signal;

parsing the coded video signal to obtain a sequence of video frames; and

parsing each video frame to obtain the header information, video packet information, and macroblock data, wherein the macroblock data includes multiple macroblocks.

4. (Canceled)

5. (Previously Presented) The method of claim 1, wherein estimating the damaged macroblock using the undamaged macroblocks comprises:

computing a pixel value for each pixel in the damaged macroblock as a function of associated pixels in the undamaged macroblocks substantially surrounding the boundary of the damaged macroblock.

6. (Currently Amended) A method comprising:

detecting an error by locating a damaged macroblock ($P_{x,y}$) in multiple macroblocks in a video frame using header information, global information, and/or video packet information in the video frame by a video decoder;

estimating a pixel value for each pixel in the damaged macroblock by computing a weighted sum of the associated pixel values in each of the undamaged macroblocks surrounding the damaged macroblock by the video decoder, wherein, in estimating, the undamaged macroblocks surrounding the damaged macroblock include about 1 to 4 undamaged macroblocks ($P_{x,y-1}$, $P_{x+1,y}$, $P_{x,y+1}$, and/or $P_{x-1,y}$); and

copying the estimated pixel value of each pixel in the damaged macroblock to conceal the error in the damaged macroblock by the video decoder.

7. (Canceled)

8. (Original) The method of claim 6, wherein, in computing, the computed weight of each associated pixel is inversely proportional to the distance between a pixel being estimated and a pixel being used for estimation.

9. (Currently Amended) ~~The method of claim 6,~~ A method comprising:

detecting an error by locating a damaged macroblock in multiple macroblocks in a video frame using header information, global information, and/or video packet information in the video frame by a video decoder;

estimating a pixel value for each pixel in the damaged macroblock by computing a

weighted sum of the associated pixel values in each of the undamaged macroblocks surrounding the damaged macroblock by the video decoder; and

copying the estimated damaged macroblock to conceal the error in the damaged macroblock by the video decoder,

wherein estimating the pixel value of each pixel in the damaged macroblock by computing a weighted sum of the associated pixels in each of the undamaged macroblocks surrounding the damaged macroblock comprises:

checking each of the macroblocks surrounding the damaged macroblock for an error in the current video frame;

if there is an error, then choosing undamaged macroblocks based on the detected error and computing a weighted sum of absolute differences between pixel values in the chosen undamaged macroblocks surrounding the damaged macroblock in the current frame and associated pixel values in associated macroblocks in a previous video frame;

if there is no error, then choosing all macroblocks surrounding the damaged macroblock as the undamaged macroblocks and computing a weighted sum of absolute differences between pixel values in the chosen macroblocks surrounding the damaged macroblock and associated macroblocks in the previous video frame;

determining a number of chosen undamaged macroblocks used in computing the weighted sum of absolute differences;

computing a sum value by dividing the computed weighted sum of the absolute differences by the number of chosen undamaged macroblocks;

comparing the computed sum value with a threshold value;

if the computed sum value is less than or equal to the threshold value, then using a spatial interpolation to estimate the damaged macroblock to conceal the error; and

if the computed sum value is greater than the threshold value, then copying an associated undamaged macroblock in a previous video frame to conceal the error.

10. (Original) The method of claim 6, wherein the header information includes information selected from the group consisting of a frame start code, header information, and a stuffing bit pattern.

11. (Original) The method of claim 6, wherein the video packet information includes information selected from the group consisting of resync marker data, a macroblock number, and motion and header information.

12. (Currently Amended) A method comprising:

detecting a channel error by locating a damaged macroblock in multiple macroblocks in a current video frame using header information, global information, and/or video packet information in the video frame by a video decoder;

reconstructing the damaged macroblock by estimating a motion vector of the damaged macroblock using motion vectors of undamaged macroblocks surrounding the damaged macroblock by the video decoder, wherein reconstruction of the damaged macroblock by estimating the motion vector of the damaged macroblock using the motion vectors of the undamaged macroblocks surrounding the damaged macroblock comprises:

estimating the motion vector of the damaged macroblock in the current video frame;

estimating a motion vector of a macroblock located substantially adjacent and above the damaged macroblock;

estimating a motion vector of a macroblock located substantially below the damaged macroblock;

estimating a motion vector of a macroblock located substantially adjacent, above, and left of the damaged macroblock;

checking for error in the macroblock located substantially below the damaged macroblock; and

if there is an error in the macroblock located substantially below the damaged macroblock, then estimating the motion vector of the ~~damaged macroblock as the motion vector of the~~ macroblock located substantially below the damaged macroblock by assigning a motion vector of a macroblock located about 2 rows below the damaged macroblock ~~adjacent and above the damaged macroblock;~~ and

copying the reconstructed damaged macroblock to conceal the error in the damaged

macroblock by the video decoder.

13. (Original) The method of claim 12, wherein using the motion vectors of the undamaged macroblocks surrounding the damaged macroblock comprises:

using the motion vectors of undamaged macroblocks located in two rows that are substantially adjacent to the damaged macroblock.

14. (Canceled)

15. (Currently Amended) ~~The method of claim 12, further comprising:~~ A method comprising:

detecting a channel error by locating a damaged macroblock in multiple macroblocks in a current video frame using header information, global information, and/or video packet information in the video frame by a video decoder;

reconstructing the damaged macroblock by estimating a motion vector of the damaged macroblock using motion vectors of undamaged macroblocks surrounding the damaged macroblock by the video decoder, wherein reconstruction of the damaged macroblock by estimating the motion vector of the damaged macroblock using the motion vectors of the undamaged macroblocks surrounding the damaged macroblock comprises:

estimating the motion vector of the damaged macroblock in the current video frame;

estimating a motion vector of a macroblock located substantially adjacent and above the damaged macroblock;

estimating a motion vector of a macroblock located substantially below the damaged macroblock;

estimating a motion vector of a macroblock located substantially adjacent, above, and left of the damaged macroblock;

checking for error in the macroblock located substantially below the damaged macroblock;

if there is an error in the macroblock located substantially below the damaged macroblock, then estimating the motion vector of the damaged macroblock as the motion

vector of the macroblock located substantially adjacent and above the damaged macroblock;

if there is error in the associated macroblock located substantially below the damaged macroblock, then estimating the motion vector of the macroblock located substantially below the damaged macroblock by assigning a motion vector of a macroblock located about 2 rows below the damaged macroblock, and then computing a motion distance by computing a sum of absolute difference between the motion vectors of the macroblock located substantially adjacent and above the damaged macroblock and the macroblock located substantially below the damaged macroblock;

if the computed motion distance is less than a motion threshold value, then estimating the motion of the damaged macroblock using the equation:

motion vector of the damaged macroblock=((α)*motion vector of the macroblock located substantially adjacent and above the damaged macroblock+(1- α)*motion vector of the macroblock located substantially below the damaged macroblock);

if the computed motion distance is greater than or equal to the motion threshold value, then computing a first motion vector difference by computing a sum of absolute difference between the motion vectors of the macroblock located substantially adjacent, above, and left of the damaged macroblock and the macroblock located substantially adjacent and above the damaged macroblock, and further computing a second motion vector difference by computing a sum of absolute difference between the motion vectors of the macroblock located substantially adjacent, above, and left of the damaged macroblock and the macroblock located substantially below the damaged macroblock;

if the first motion vector difference is less than or equal to the second motion vector difference, then estimating the motion vector of the damaged macroblock as the motion vector of the macroblock located substantially adjacent and above the damaged macroblock; and

if the first motion vector difference is greater than the second motion vector difference, then estimating the motion vector of the damaged macroblock as the motion vector of the macroblock located substantially below the damaged macroblock~~.~~; and

copying the reconstructed damaged macroblock to conceal the error in the damaged macroblock by the video decoder.

16. (Previously Presented) The method of claim 12, wherein, in estimating, the macroblock located substantially below the damaged macroblock comprises a macroblock located about two rows below the damaged macroblock.

17. (Currently Amended) An apparatus comprising:

a header decoding module parses a video frame to get header information and multiple macroblocks;

an error recovery module detects a channel error by locating a damaged macroblock ($P_{x, y}$) in the multiple macroblocks using the header information; and

a spatial data error concealment module estimates the damaged macroblock by using undamaged macroblocks substantially surrounding a boundary of the damaged macroblock and replaces the damaged macroblock with the estimated damaged macroblock to conceal the channel error in the damaged macroblock, wherein the undamaged macroblocks include 1 to 4 undamaged macroblocks ($P_{x, y-1}$, $P_{x+1, y}$, $P_{x, y+1}$, and $P_{x-1, y}$), and wherein the spatial data error concealment module estimates the damaged macroblock by using a weighted linear interpolation of the undamaged macroblocks surrounding the damaged macroblock.

18. (Original) The apparatus of claim 17, further comprising: a bit stream demux module receives a coded video signal and obtains a sequence of video frames.

19. (Canceled)

20. (Original) The apparatus of claim 17, wherein the spatial data error concealment module estimates the damaged macroblock by computing a pixel value for each pixel in the damaged macroblock as a function of associated pixels in the undamaged macroblocks surrounding the damaged macroblock.

21. (Currently Amended) A video decoder comprising:

a header decoding module to parse a video frame to get header information, video packet information, and multiple macroblocks;

an error recovery module to detect an error in a damaged macroblock ($P_{x,y}$) in the multiple macroblocks of the video frame using the header information and/or the video packet information; and

a spatial data error concealment module to estimate a pixel value for each pixel in the damaged macroblock by computing a weighted sum of associated pixel values in each of undamaged macroblocks surrounding the damaged macroblock, wherein the spatial data error concealment module to copy the estimated pixel value of each pixel in the damaged macroblock to conceal the error in the damaged macroblock, wherein the undamaged macroblocks surrounding the damaged macroblock include about 1 to 4 undamaged macroblocks ($P_{x,y-1}$, $P_{x+1,y}$, $P_{x,y+1}$, and/or $P_{x-1,y}$) substantially surrounding the damaged macroblock.

22. (Canceled)

23. (Original) The video decoder of claim 21, wherein the computed weight of each associated pixel is inversely proportional to the distance between an estimated pixel and a pixel being used for estimation.

24. (Currently Amended) An apparatus for decoding a coded video signal comprising:

a header decoding module parses a video frame to get header information and multiple macroblocks;

an error recovery module detects a channel error by locating a damaged macroblock in the multiple macroblocks using the header information, global information, and/or video packet information in the video frame;

a spatial data error concealment module obtains motion vectors of undamaged macroblocks surrounding the damaged macroblock, wherein the spatial error concealment module estimates a motion vector of the damaged macroblock using the motion vectors of undamaged macroblocks, wherein the spatial data error concealment module reconstructs the damaged macroblock using the estimated damaged macroblock, wherein the spatial data error concealment module estimates the motion vector of the damaged macroblock using the motion vectors of the undamaged macroblocks located in about two rows that are substantially adjacent

and below the damaged macroblock, and wherein reconstruction of the damaged macroblock by estimating the motion vector of the damaged macroblock comprises:

estimating the motion vector of the damaged macroblock in the current video frame;

estimating a motion vector of a macroblock located substantially adjacent and above the damaged macroblock;

estimating a motion vector of a macroblock located substantially below the damaged macroblock; and

estimating a motion vector of a macroblock located substantially adjacent, above, and left of the damaged macroblock; and

copying the reconstructed damaged macroblock to conceal the error in the damaged macroblock.

25. (Canceled)

26. (Currently Amended) An article comprising:

a storage medium encoded with a computer program that, when executed by a computing platform, result in execution of a method comprising:

detecting a channel error by locating a damaged macroblock ($P_{x, y}$) in multiple macroblocks of a video frame using header information;

estimating the damaged macroblock by using undamaged macroblocks surrounding the damaged macroblock in the video frame, wherein the undamaged macroblocks include 1 to 4 undamaged macroblocks ($P_{x, y-1}$, $P_{x+1, y}$, $P_{x, y+1}$, and $P_{x-1, y}$), and wherein estimating the damaged macroblock includes estimating the damaged macroblock by using a weighted linear interpolation of the undamaged macroblocks surrounding the damaged macroblock; and

replacing the damaged macroblock with the estimated damaged macroblock to conceal the error in the damaged macroblock.

27. (Canceled)

28. (Original) The article of claim 26, wherein estimating the damaged macroblock using the undamaged macroblocks comprises:

computing a pixel value for each pixel in the damaged macroblock as a function of associated pixels in the undamaged macroblocks surrounding the damaged macroblock.

29. (Currently Amended) A system comprising:

a bus;

a processor coupled to the bus;

a memory coupled to the processor;

a network interface coupled to the processor and the memory; and

a video decoder coupled to the network interface comprising:

a header decoding module parses a video frame to get header information and multiple macroblocks;

an error recovery module coupled to the header decoding module detects a channel error by locating a damaged macroblock ($P_{x, y}$) in the multiple macroblocks using the header information; and

a spatial data error concealment module coupled to the error recovery module estimates the damaged macroblock by using undamaged macroblocks surrounding the damaged macroblock and replaces the damaged macroblock with the estimated damaged macroblock to conceal the channel error in the damaged macroblock, wherein the undamaged macroblocks include 1 to 4 undamaged macroblocks ($P_{x, y-1}$, $P_{x+1, y}$, $P_{x, y+1}$, and $P_{x-1, y}$), and wherein the spatial data error concealment module estimates the damaged macroblock by using a weighted linear interpolation of the undamaged macroblocks surrounding the damaged macroblock.

30. (Original) The system of claim 29, further comprising:

a bit stream demux module coupled to the header decoding module receives a coded video signal and obtains a sequence of video frames.

31. (Canceled)